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EXAMINER

SUMMONS, BARBARA

ART UNIT	PAPER NUMBER
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2817

DATE MAILED: 04/07/2003

Please find below and/or attached an Office communication concerning this application or proceeding.

# Office Action Summary

Application No.

10/037,292

Applicant(s)

Borzenets et al.

Examiner

Barbara Summors

Group Art Unit

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— The MAILING DATE of this communication appears on the cover sheet beneath the correspondence address —

## Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 (three) MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, such period shall, by default, expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

## Status

- ☐ Responsive to communication(s) filed on \_\_\_\_\_
- ☐ This action is **FINAL**.
- ☐ Since this application is in condition for allowance except for formal matters, **prosecution as to the merits is closed** in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11; 453 O.G. 213.

## Disposition of Claims

- ☒ Claim(s) 1-21 is/are pending in the application.
- Of the above claim(s) \_\_\_\_\_ is/are withdrawn from consideration.
- ☒ Claim(s) 18 and 19 is/are allowed.
- ☒ Claim(s) 1, 3, 4, 12-14, 16, 17, 20 and 21 is/are rejected.
- ☒ Claim(s) 5-11 and 15 is/are objected to.
- ☐ Claim(s) \_\_\_\_\_ are subject to restriction or election requirement

## Application Papers

- ☐ The proposed drawing correction, filed on \_\_\_\_\_ is ☐ approved ☐ disapproved.
- ☒ The drawing(s) filed on 12/31/01 is/are objected to by the Examiner
- ☒ The specification is objected to by the Examiner.
- ☐ The oath or declaration is objected to by the Examiner.

## Priority under 35 U.S.C. § 119 (a)-(d)

- ☐ Acknowledgement is made of a claim for foreign priority under 35 U.S.C. § 119 (a)-(d).
- ☐ All ☐ Some\* ☐ None of the:
  - ☐ Certified copies of the priority documents have been received.
  - ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_
  - ☐ Copies of the certified copies of the priority documents have been received in this national stage application from the International Bureau (PCT Rule 17.2(a))

\*Certified copies not received: \_\_\_\_\_

## Attachment(s)

- ☒ Information Disclosure Statement(s), PTO-1449, Paper No(s). 5
- ☒ Notice of Reference(s) Cited, PTO-892
- ☐ Notice of Draftsperson's Patent Drawing Review, PTO-948
- ☐ Interview Summary, PTO-413
- ☐ Notice of Informal Patent Application, PTO-152
- ☐ Other \_\_\_\_\_

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## DETAILED ACTION

### *Drawings*

1. The drawings are objected to under 37 CFR 1.83(a). The drawings must show every feature of the invention specified in the claims. Therefore, the tuning assembly that "further comprises a varactor corresponding to a tuning tip...", as recited in claim 15, must be shown or the feature(s) canceled from the claim(s). No new matter should be entered.

A proposed drawing correction or corrected drawings are required in reply to the Office action to avoid abandonment of the application. The objection to the drawings will not be held in abeyance.

### *Specification*

2. The disclosure is objected to because of the following informalities:

On page 7, on each of lines 22 and 23, "100" should be --110-- (see e.g. pg. 6, lns. 5-6).

On page 8, line 14, "222" should be followed by --(one of 222a-222d)--, as done on line 18 for element 230, so that all elements labeled in the figures are mentioned in the description [see Fig. 2].

Appropriate correction is required.

3. The abstract of the disclosure is objected to because it must be one paragraph. Correction is required. See MPEP § 608.01(b).

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*Claim Numbering*

4. It should be noted that two claims were listed as claim 15. Therefore, the claims numbered 15-20, beginning from the second claim 15 (i.e. on line 5 of page 21), have been renumbered as claims 16-21 [see 37 CFR § 1.75 (f)]. Note that former claim 18 which was dependent upon claim 17, is now claim 19 dependent upon claim 18. This is the only case wherein, not only the claim number, but also the claim dependency number was changed.

*Claim Rejections - 35 USC § 102*

5. The following is a quotation of the appropriate paragraphs of 35 U.S.C. § 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless -

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

6. Claims 14 and 17 are rejected under 35 U.S.C. § 102(b) as being anticipated by Sochor U.S. 5,968,876 (cited by Applicants).

Fig. 9 of Sochor discloses a tuning assembly for tuning the resonant frequency of a resonator, the resonator comprising a capacitor (not shown, see col. 5, lns. 55-58) and an inductor 100 (see col. 4, lns. 12-13 and col. 1, lns. 21-26), the tuning assembly comprising: a plurality of tuning tips 20 (see e.g. Fig. 1 and col. 3, ln. 45) comprising a superconductor 80; and a plurality of actuators (Figs. 8 and 9 and col. 5, lns. 7-15), each actuator being operatively linked to a corresponding tuning tip 20, and each actuator being configured to position the corresponding tuning tip over a range of distances from the resonator in the up down arrow

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direction in Fig. 9. Regarding claim 17, the tuning tips are disclosed to also be made of a dielectric rather than a superconductor (see col. 5, lns. 55-58).

7. Claim 21 is rejected under 35 U.S.C. § 102(b) as being anticipated by Higaki et al. U.S. 5,391,543.

Figs. 4 and 5 of Higaki et al. disclose a method of tuning a resonator/filter (see col. 2, lns. 14-20, col. 1, lns. 53-60, and col. 7, lns. 59-62) having at least one resonator 10/11 (see Fig. 2 and col. 5, lns. 20-22), comprising: positioning a tuning tip 61a at a range of distances from the resonator, the range being sufficient to cause the resonant frequency of the resonator to vary by at least about 1% of the resonant frequency (i.e. actually, by more than 10% because the frequency varies from 4.165 GHz to 4.732 GHz when a superconductor is used for tip 61a, where 1% of the frequency is 0.04165 GHz to 0.04732 GHz)[see e.g. col. 7, lns. 33-45]; and maintaining the Q-factor of the filter at not less than 10,000 (i.e. at 13500 to 13800)[see col. 7, ln. 45].

### *Claim Rejections - 35 USC § 103*

8. The following is a quotation of 35 U.S.C. § 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

This application currently names joint inventors. In considering patentability of the claims under 35 U.S.C. 103(a), the examiner presumes that the subject matter of the various claims was

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commonly owned at the time any inventions covered therein were made absent any evidence to the contrary. Applicant is advised of the obligation under 37 CFR 1.56 to point out the inventor and invention dates of each claim that was not commonly owned at the time a later invention was made in order for the examiner to consider the applicability of 35 U.S.C. 103(c) and potential 35 U.S.C. 102(e), (f) or (g) prior art under 35 U.S.C. 103(a).

9. Claim 16 is rejected under 35 U.S.C. § 103(a) as being unpatentable over Sochor U.S. 5,968,876 (cited by Applicants) taken alone.

Sochor discloses the invention as discussed above, except Sochor does not explicitly disclose using actuators and tuning tips over the inductor and the capacitor in the same device.

Sochor discloses different types of tuning tips including tuning tips that are superconductors (see e.g. col. 3, lns. 52-55 and col. 5, lns. 55-56) being provided over inductors (col. 4, lns. 10-13) and tuning tips that are dielectric being provided over capacitors (see col. 5, lns. 56-58). Sochor also discloses tuning tips movable laterally (see col. 2, lns. 45-49).

Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to have modified the tuning assembly of Sochor (Fig. 9), if even necessary, such that one of the actuators and tuning tips would have been over a capacitor, because such an obvious modification would have been based on various well known design considerations as is suggested by Sochor (see col. 1, lns. 64-67), and because of the explicit suggestions by Sochor to use tuning tips over capacitors (col. 5, lns. 56-58) and to move the tuning tips laterally (see col. 2, lns. 45-49), wherein movement in a lateral direction would have moved the tip over a capacitor.

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10. Claims 1, 3, 4, 12, 13, and 20 are rejected under 35 U.S.C. § 103(a) as being unpatentable over Sochor U.S. 5,968,876 (cited by Applicants) in view of Higaki et al. U.S. 5,391,543.

Sochor discloses a tuning assembly and a corresponding method of tuning a filter as discussed above. Regarding claim 12, Sochor also discloses a frequency sensing oscilloscope (see col. 5, lns. 29-31) for measuring the output of the resonator/filter. Regarding claim 3, the actuator comprises a moving arm (Fig. 8) and a driver being an XYZ stage (col. 5, lns. 16-17).

Sochor is silent as to the exact values of Q of its high Q filters (see col. 2, lns. 4-7) and as to the percent of frequency change resulting from the tuning. Sochor also does not show a closed-loop feedback control system from the oscilloscope, and is silent as to how the XYZ stage is driven, not explicitly stating that the XYZ stage is driven by an electrical motor.

However, Sochor does cite Higaki et al. (see col. 2, lns. 5-11) and states that providing a non-screw type tuning member is an improvement over Higaki et al.'s screw type tuning member (col. 2, lns. 13-30). Therefore, it is the Examiner's position, absent any objective evidence to the contrary, that the tuning member of Sochor, which is only different from Higaki et al.'s in that it is not a screw type, provides similar frequency tuning ranges of over 10% and Q values greater than 10,000 as that of Higaki et al. (col. 7, lns. 33-45).

Regarding claims 4 and 13, the Examiner takes Official Notice that closed-loop feedback control systems (e.g. for automatic resonator tuning) would have been extremely well known, as evidenced by other prior art of record [see Cavey U.S. 6,147,577 (cited by Applicants) and Hicks et al. U.S. 5,739,731 cited below], and that XYZ stages (i.e. moveable in each of the x y and z

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directions) would have been well known to comprise electrical motors to provide the desired directional movement as evidenced by other prior art of record (see Miyagawa U.S. 5,523,699 cited below).

Consequently, it would have been obvious to one of ordinary skill in the art at the time the invention was made to have modified the tuning assembly and method of Sochor, if even necessary, to have provided a frequency change of at least about 1% and a Q-factor of at least 10,000 in view of the exemplary teaching that the same type of tuning element, with a superconductor tuning tip, in Higaki et al. would have provided such desirable results (see Higaki col. 7, lns. 33-45). It would have been equally obvious to one of ordinary skill in the art at the time the invention was made to have modified the tuning assembly and method of Sochor by having provided a closed-loop feedback control system from the oscilloscope and, if even necessary, an electrical motor to drive the XYZ stage, because such obvious modifications would have provided the well known desirable result of automatic tuning, and because Sochor is silent as to how the XYZ stage is driven, thereby suggesting to one of ordinary skill that any well known method, such as typically used electrical motors (see evidence in the other prior art of record), would have been usable therewith.

*Allowable Subject Matter*

11. Claims 18 and 19 are allowable over the prior art of record.



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12. Claims 2, 5-11, 15 are objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.

13. The following is a statement of reasons for the indication of allowable subject matter:

The prior art of record does not disclose or fairly suggest a tuning assembly or associated method of tuning, comprising each of the recited combinations of features, and especially: also moving the tuning tip in "steps that correspond to resonant frequency changes of about 0.01% or less" (claim 2); or having the tuning tip be a "superconductor having a size at least as large as a footprint of the inductor" (claim 5); or also having "a thermal isolator positioned between the tuning tip and the driver" (claim 6); or also having a "position sensing device... to measure the position of the tuning tip" (claim 7); or also having a "varactor" for "smaller" frequency adjustments than the tuning tip (see claim 15); or adjusting the "bandwidth" (see claim 18).

### *Conclusion*

14. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure.

Zhang et al. U.S. 6,438,394 discloses (see Figs. 3 and 4) inductor/capacitor superconductor filters having a structure similar to Applicants, and Zhang et al. was cited by Sochor (see col. 1, lns. 28-31).

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Matthaei U.S. 5,888,942 discloses (Fig. 9A) a hairpin type superconductor resonator filter having capacitors 51 over which dielectric tipped tuning tips 53 are placed.

Hey-Shipton et al. U.S. 5,616,538 discloses a superconductor tipped tuning tip tuning a superconductor resonator by approaching the resonator from the ground plane side (see Fig. 13).

Hicks et al. U.S. 5,739,731 provides evidence of the obviousness of closed-loop feedback control for automatic resonator tuning systems (see e.g. the abstract and Figs. 2, 5, and 8-11).

Miyagawa U.S. 5,523,699 discloses that XYZ stages are well known to be driven by electrical motors (see col. 6, lns 55-58) which are automatically controlled (see col. 6, lns. 59-61) suggesting closed-loop feedback control.

Tanaka JP 1-170102 discloses a dielectric resonator filter (Fig. 1) with the resonators 3-5 tuned by members 6-8 with superconductive tips 9-11 so as not to deteriorate the Q-factor of the filter (see the abstract).

Eden et al. U.S. 6,347,237; Shen U.S. 6,522,217; and Murayama JP 2001-211004 each disclose tuning superconductive filters by moving a plane covered with superconductive material toward or away from the filters.

15. Any inquiry concerning this communication should be directed to Barbara Summons at telephone number (703) 308-4947, FAX no. (703) 308-7724, receptionist's no. (703) 308-0956. Supervisory Examiner Bob Pascal (703) 308-4909.



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Art Unit 2817

bs  
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